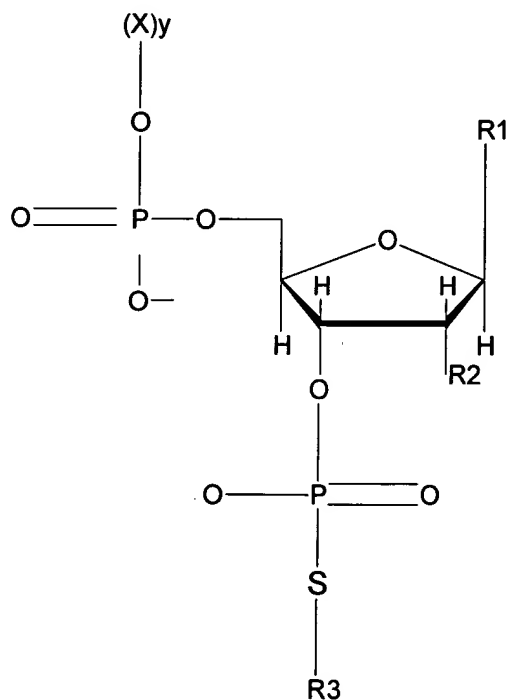


CURRENT STATUS OF ALL CLAIMS

1. (Currently amended) A method of non-enzymatic ligation of a nucleic acid, comprising contacting a polynucleotide-3' phosphorothiolate with an acceptor polynucleotide under conditions that allow formation of a phosphodiester bond between said polynucleotide-3' phosphorothiolate and said acceptor polynucleotide, wherein a phosphodiester bond is formed between said polynucleotide-3' phosphorothiolate and said acceptor polynucleotide, whereby a ligated nucleic acid product is generated.

2. (Previously amended) The method of claim 1, wherein said polynucleotide-3' phosphorothiolate comprises a moiety having the formula:



wherein,

X is a nucleotide;

y is a positive integer;

R1 is a nucleotide base;

R2 is a hydrogen atom or hydroxyl; and

R3 is nitrophenyl.

3. (Original) The method of claim 1, wherein said polynucleotide-3' phosphorothiolate further comprises a duplex polynucleotide.

4. (Original) The method of claim 1, wherein said acceptor polynucleotide further comprises a duplex polynucleotide.

5. (Amended) A method of replicating a ligated nucleic acid product ~~generating a polynucleotide product,~~ comprising:

(a) contacting a polynucleotide-3' phosphorothiolate with an acceptor polynucleotide under conditions that allow formation of a phosphodiester bond between said polynucleotide-3' phosphorothiolate and said acceptor polynucleotide, wherein a ~~polynucleotide-3' phosphorothiolate having a phosphodiester bond with said acceptor polynucleotide is formed~~ phosphodiester bond is formed between said polynucleotide-3' phosphorothiolate and said acceptor polynucleotide to generate a ligated nucleic acid product, wherein one of said polynucleotide-3' phosphorothiolate or said acceptor polynucleotide comprises a vector, and

(b) transducing into a host cell said polynucleotide product, wherein said polynucleotide product is replicated in said host cell ~~polynucleotide-3' phosphorothiolate having a phosphodiester bond with said acceptor polynucleotide.~~

6. (Currently amended) A method of non-enzymatic ligation of a nucleic acid, comprising:

(a) contacting a polynucleotide-3' phosphorothiolate precursor and an activator under conditions sufficient to react said polynucleotide-3' phosphorothiolate precursor and said activator, wherein said polynucleotide-3' phosphorothiolate precursor reacts with said iodonitrobenzene to produce a polynucleotide-3' phosphorothiolate, and

(b) contacting said polynucleotide-3' phosphorothiolate with an acceptor polynucleotide under conditions that allow formation of a phosphodiester bond between said polynucleotide-3' phosphorothiolate and said acceptor polynucleotide, wherein a phosphodiester bond is formed between said polynucleotide-3' phosphorothiolate and said acceptor polynucleotide, whereby a ligated nucleic acid product is generated.

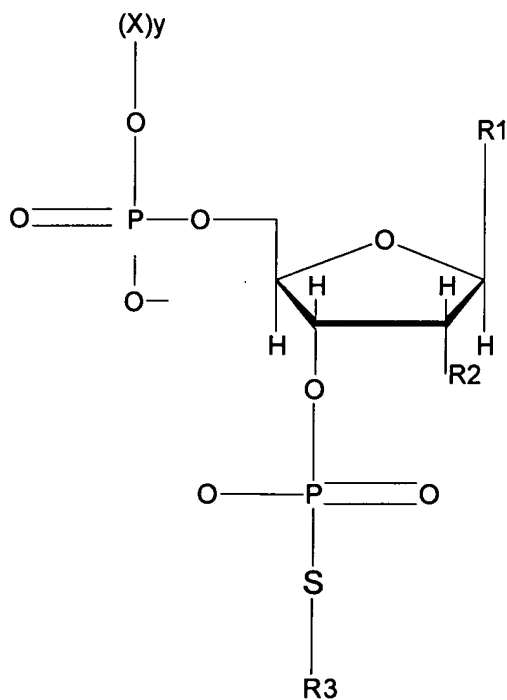
7. (Original) The method of claim 6, wherein said activator is iodonitrobenzene.

8. (Currently amended) A method of ~~molecular cloning~~ ligating a vector and an insert comprising, contacting an insert comprising a polynucleotide-3' phosphorothiolate with an acceptor vector under conditions that allow formation of a phosphodiester bond between said insert and said acceptor

vector, wherein a phosphodiester bond is formed between said insert and said acceptor vector, whereby a ligated product vector comprising said insert is generated ~~to generate a vector comprising an insert polynucleotide.~~

9. (Currently amended) The method of claim 8, further comprising transforming said vector comprising said insert ~~an insert polynucleotide~~ into a host cell.

10. (Previously amended) The method of claim 8, wherein said polynucleotide-3' phosphorothiolate comprises a moiety having the formula:



wherein,

X is a nucleotide;

y is a positive integer;

R1 is a nucleotide base;

R2 is a hydrogen atom or hydroxyl; and

R3 is nitrophenyl.

11. (Currently amended) A method of ~~molecular cloning~~ ligating a vector and an insert comprising:

(a) contacting a polynucleotide-3' phosphorothiolate precursor and iodonitrobenzene under conditions sufficient to react said polynucleotide-3' phosphorothiolate precursor and said iodonitrobenzene, wherein said polynucleotide-3' phosphorothiolate precursor reacts with said iodonitrobenzene to produce a polynucleotide-3' phosphorothiolate, and

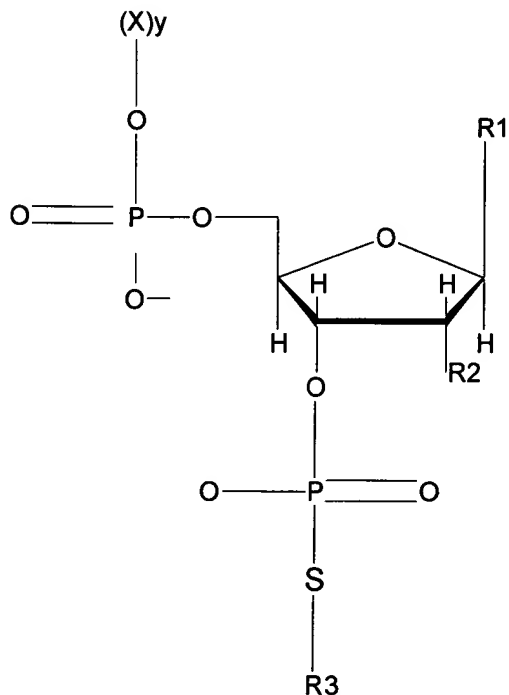
(b) contacting an insert comprising said polynucleotide-3' phosphorothiolate with an acceptor vector under conditions that allow formation of a phosphodiester bond between said insert and said acceptor vector, wherein a phosphodiester bond is formed between said insert and said acceptor vector, whereby a ligated product vector comprising said insert is generated ~~to generate a vector comprising an insert polynucleotide.~~

12. (Currently amended) A method of ~~molecular cloning~~ ligating a vector and a polynucleotide comprising, contacting a vector comprising a polynucleotide-3' phosphorothiolate with an acceptor polynucleotide, under conditions that allow formation of a phosphodiester bond between said vector and said acceptor polynucleotide, wherein a phosphodiester bond is formed between said vector and said acceptor polynucleotide, whereby a ligated product vector

~~comprising said polynucleotide is generated to generate a vector comprising said acceptor polynucleotide.~~

13. (Original) The method of claim 12, further comprising transforming said vector comprising said acceptor polynucleotide into a host cell.

14. (Previously amended) The method of claim 12, wherein said polynucleotide-3' phosphorothiolate comprises a moiety having the formula:



wherein,

X is a nucleotide;

y is a positive integer;

R1 is a nucleotide base;

R2 is a hydrogen atom or hydroxyl; and

R3 is nitrophenyl.

15. (Currently amended) The method of claim 12, wherein said vector further comprises a 3' phosphorothiolate moiety at one or more terminal ends of said vector.

16. (Currently amended) A method of ligating a vector and a polynucleotide ~~molecular cloning~~ comprising:

(a) contacting a polynucleotide-3' phosphorothiolate precursor and an activator under conditions sufficient to react said polynucleotide-3' phosphorothiolate precursor and said activator to produce a polynucleotide-3' phosphorothiolate, wherein said polynucleotide-3' phosphorothiolate precursor reacts with said iodonitrobenzene to produce a polynucleotide-3' phosphorothiolate, and

(b) contacting a vector comprising said polynucleotide-3' phosphorothiolate with an acceptor polynucleotide, under conditions that allow formation of a phosphodiester bond between said vector and said acceptor polynucleotide, wherein a phosphodiester bond is formed between said vector and said acceptor polynucleotide, whereby a ligated product vector comprising said polynucleotide is generated ~~to generate a vector comprising said acceptor polynucleotide~~.

Claims 17 to 56. Cancelled previously.